PEACE/WILLISTON
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Fish Habitat Enhancement Potential And Stocking Assessment Of Canty Lake

R. J. Zemlak and A. R. Langston
1994

PWFWCP Report No. 124

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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Author(s): Randy J. Zemlak[1] and Arne Langston[1]
Address(es): [1] Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave., 3rd Floor Prince George, B.C. V2L 3H9

105-02879/

CANTY LAKE

WATERSHED: Parsnip River

DATE OF SURVEY: October 6. 7. 1994

FIELD CREW LEADER: A.R. Langston

FIELD ASSISTANT: R.J. Zemlak

PEACE/WILLISTON COMPENSATION PROGRAM

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ENVIRONMENTAL AFFAIRS

and

B.C. ENVIRONMENT

FISH AND WILDLIFE BRANCH

REPORT PREPARED BY: R.J. Zemlak / A.R. Langston

Lake: **Canty**

INTRODUCTION

A standard fisheries baseline reconnaissance survey of Canty Lake was carried out by the Peace/Williston Fisheries Compensation Program (Prince George) in July of 1989. Canty Lake was determined to be barren of all fish species at that time. The report is on file at the Ministry of Environment, Lands and Parks, Fish and Wildlife Branch, Prince George.

Canty Lake was investigated in October of 1994 by the Peace/Williston Fisheries Compensation Program to identify potential fisheries enhancement projects and to evaluate the success of the current stocking program.

STOCKING HISTORY

Canty Lake was initially stocked with 5,000 rainbow trout in 1990 (Table #1). The current stocking program consists of 2,500 rainbow trout fall fry introduction every fourth year. The stocking history of Canty Lake is located in Table 1.

TABLE 1
LAKE STOCKING HISTORY

Year	Species	Number	Size (g)	Stage	Stock
1990	rainbow trout	5,000	0.6	fall fry	Dragon
1994	rainbow trout	2,500	1.7	fall fry	Dragon - Premier

LOCATION

Location:	78 km North of Mackenzie (Figure 1)	
Elevation:	1,295 m ±	
Latitude/Longitude:	55°57'21":123°42'23"	U.T.M.: 10.4559.62011
Management Unit:	7-30	N.T.S. Map No.: 93 0/13
Drainage:	Canty C. --> subterranean flow --> swamp --> Williston Reservoir (Parsnip Reach) --> Peace R.	

Figure 1. Location of Canty Lake.

Lake: **Canty**

METHODS

One sinking monofilament gill net and three minnow traps were used to determine relative abundance and identification of fish species in Canty Lake (See Appendix 1 for net set details) (See figure 2 for net set and minnow trap locations). The gillnet fished for 4.75 hours, while the minnow traps fished for 20, 14, and 5 hours respectively.

Rainbow trout were sampled for length, weight, sex, maturity, stomach contents, and parasite/disease presence (Appendix 2). Scale samples were collected for age determination. General appearance of the rainbow trout was determined by visual analysis.

The fisheries enhancement potential of the inlets and the outlet was evaluated through visual observations and recording of physical data, using standard methodologies outlined in the Fish/Habitat Inventory and Information Program (1987 Stream Survey Field Guide).

Rainbow trout catch per unit effort (fish/rod hour) was calculated from angling undertaken by program staff.

The benchmark set during the initial study (1989) was located and repainted (Figure 2). Any change in water level was measured using a Suunto clinometer, a two meter measuring pole and an Eslon tape.

Photo documentation of the investigation was not possible due to camera malfunction.

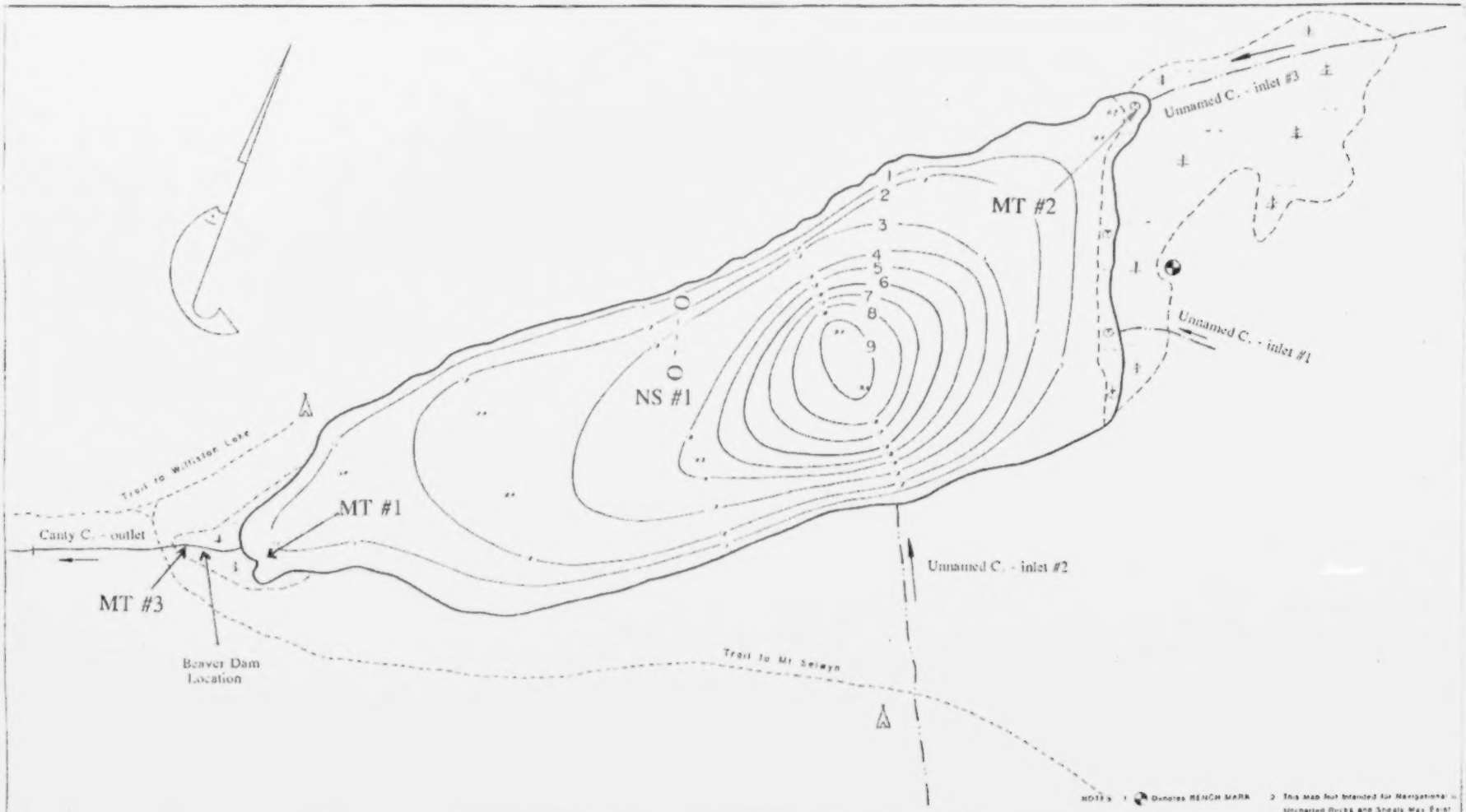
Unnamed C. - inlet #3
MT #2
Unnamed C. - inlet #1
NS #1
Trail to Wallister Lake
MT #1
Canty C. - outlet
Unnamed C. - inlet #2
MT #3
Beaver Dam Location
Trail to Mt Selwyn
INSET MAP
Scale 1:250 000
SURVEYED BY: D.A. JESSON DATE: JULY 4, 1989
OUTLINE SOURCE: AIR PHOTO BC 80078:092 (JUNE 1980)
STATISTICS AT TIME OF SURVEY
ELEVATION 1295 m ±
SURFACE AREA 75 000 sq m
AREA ABOVE 6m. CONTOUR 66 000 sq m²
VOLUME 218 000 cu m
MEAN DEPTH 2.9 m
MAX. DEPTH 9.4 m
PERIMETER, MAIN SHORE 1310 m
PERIMETER, ISLANDS – m
BENCH MARK HEIGHT ABOVE WATER LEVEL 2.0 m
Province of British Columbia
FISHERIES BRANCH
INVENTORY OPERATIONS
CANTY LAKE
DEPTHS IN METERS
SCALE 1:1500
NTS NO. 930/13

figure 2

Reduced to 50% of Original

Lake: **Canty**

RESULTS & DISCUSSIONS

A four hour and forty-five minute net set yielded 39 rainbow trout (Table 2). Three minnow traps yielded four rainbow trout (Table 3). Average fork length, weight, and condition factor were calculated for 37 of the rainbow trout captured by net and angling (Table 4). No coarse fish were captured, which is consistent with the 1989 study.

TABLE 2
LAKE CATCH SUMMARY

Species	Net Site Number				Angled	Other	Total	Number	Size (cm)
	1	2	3	4					
rainbow trout	39				6		45	37	21.3-29.5

TABLE 3
MINNOW TRAP CATCH SUMMARY

#	Hours fished	Depth (m)	Substrate	Species	Total	Size Range (cm)
1	5	0.6	gravel	none	0	0
2	20	1.1	organics	none	0	0
3	14	0.4	gravel/sand	rainbow trout	4	4.4 - 5.4

Bait: Sardines

TABLE 4
AVERAGE LENGTH, WEIGHT, AND CONDITION FACTOR

Rainbow Trout	Fork Length (cm)	Weight (g)	Condition Factor
Max	29.5	280	1.28
Mean	25.7	187.3	1.09
Min	21.3	114	0.70
Std Dev	2.4	49.4	

Number of fish sampled = 37

Condition Factor Formula: $k = (W(\text{grams}) \times 100)/L(\text{cm})^3$

Lake: **Canty**

Length vs Age

Age determination by scale analysis was obtained for 35 of the sampled rainbow trout. All fish are four years old, consistent with the stocking of fall fry (0+ age) in 1990. An indication of growth rate is provided through the length/age relationship of the rainbow trout captured by the net set and by angling (Figure 3).

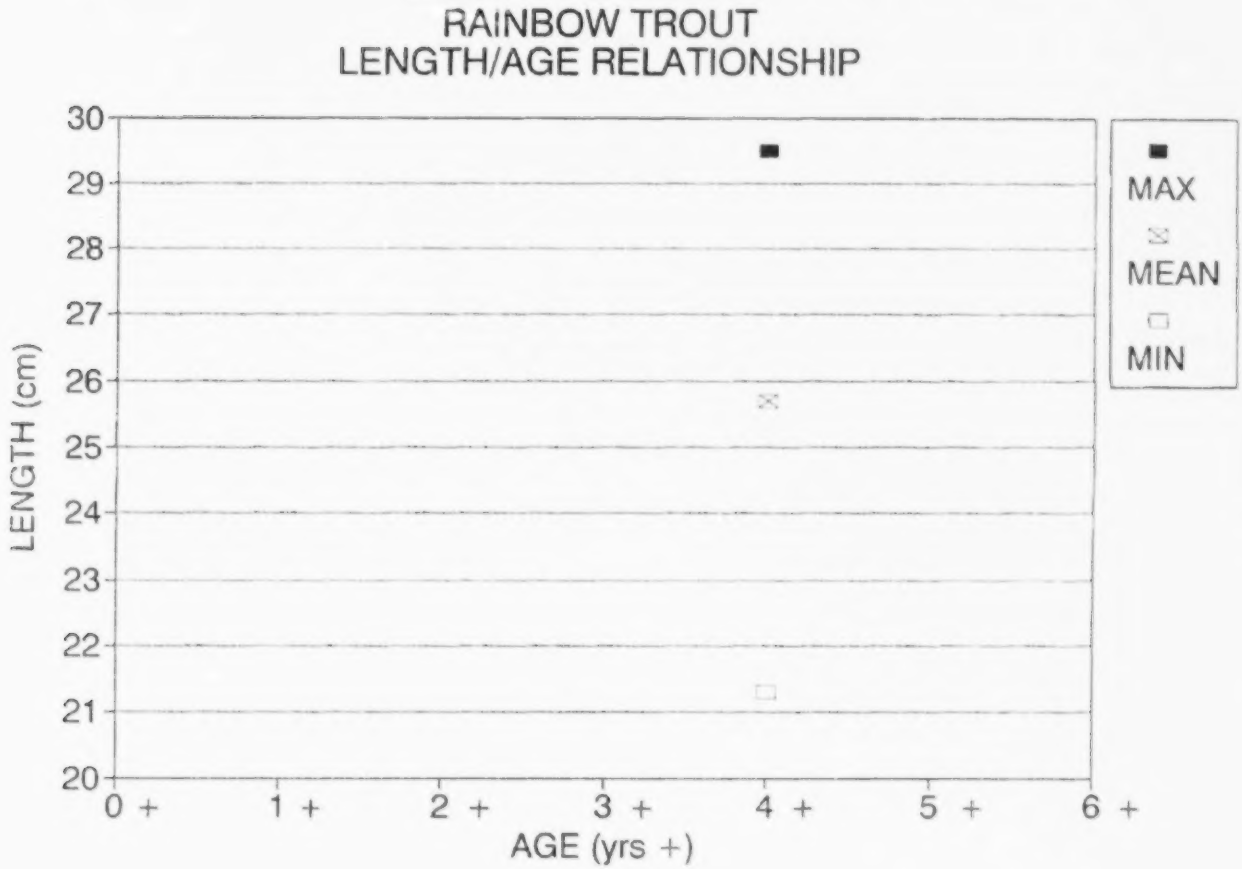

Figure 3

Lake: **Canty**

Length vs Weight

The proportionate upward trend in the length/weight relationship of 37 of the rainbow trout captured in the net set and by angling is shown in Figure 4.

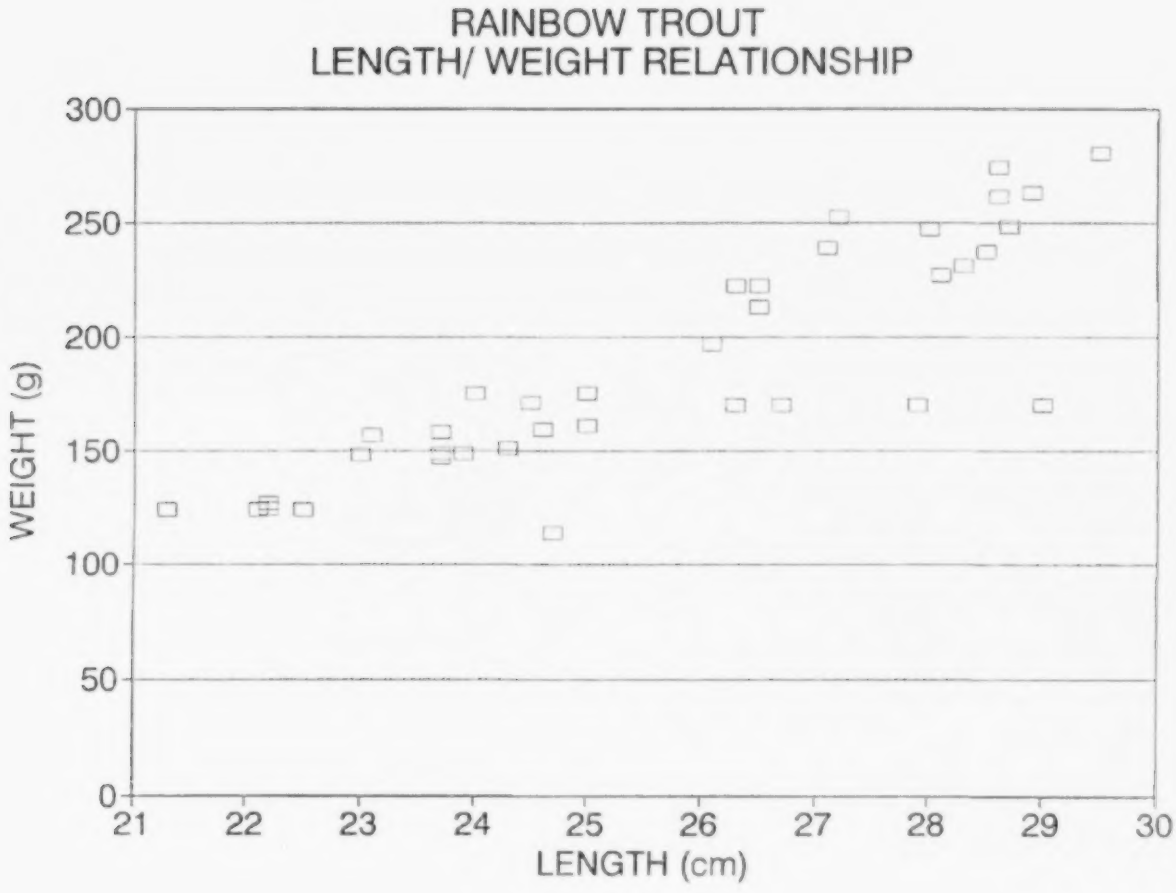

Figure 4

Lake: **Canty**

BIOLOGICAL ANALYSIS OF RAINBOW TROUT

A biological analysis was conducted on 37 rainbow trout. The rainbow trout captured during the investigation consisted of 12 males, 20 females, and 5 of undetermined sex. Reproductive organ analysis indicated 35 of the rainbow trout were maturing and two had matured. Five of the female rainbow trout had reabsorbed eggs in the body cavity. A stomach contents examination indicated a diet of mainly insects (Diptera larvae, Trichoptera, beetles, and bloodworms). Gammarus, detritus, wood, clams, Zooplankton, and fish eggs composed the rest of the stomach contents (Appendix 2). External examination indicated healthy fish while internal examination uncovered white parasites (possibly tapeworm nodules) on the inner organs of 13 rainbow trout (Appendix 2).

DRAINAGE

Unnamed C. - inlet #1

This small, intermittent creek enters the lake at the east end. It drains a low-lying forested area approximately 50 m upstream from the lake. There was no or very little flow at the time of survey. The creek has no fisheries value.

Unnamed C. - inlet #2

This small, intermittent creek enters the lake along the south shore. The creek flows off of a steep hillside at a gradient of 20 %, offering no fish habitat. The inlet was dry at the time of survey.

Unnamed C. - inlet #3

This inlet creek drains a marsh area at the NE end of the lake. At high water, the marsh is also known to drain east into Colin Creek (Dave Coombes, Recreational Fisheries, Victoria, personal communication). The inlet affords no fisheries potential (poor overall substrate). Only a small trickle of water was flowing into the lake at the time of survey.

Canty C. - outlet

Canty creek drains the lake at the SW end. In the first 100 m of stream, gradients range from 0.5 to 2.0%. The gradient increases to upwards of 35% approximately 150 m to 175 m downstream of the lake. After that, the stream plummets down a steep bedrock mountainside. Fair to good salmonid spawning and rearing habitat are present for the first 100 m of stream.

Lake: **Canty**

Lake level appears to be controlled by a beaver dam (1.5 m in height by 50 m in length) located on the outlet. The beaver dam appears to have increased the lake level by about 20 cm as some vegetation and tree bases are submerged in front of the dam. However; measurement of lake level referencing the 1989 benchmark indicates no change in the lake level. There were no beaver dams on the outlet in 1989. This suggests that the beaver dam discovered in 1994 was initially built approximately 150 m downstream of Canty Lake and subsequently flooded a low lying swampy area increasing both the surface area and littoral zone of the lake, but not affecting overall lake level. Upstream fish passage over this dam is impossible for adults and juveniles at this time of year. Upstream passage may be possible at higher spring flows for adults, but unlikely for juveniles. A point card was completed for the outlet (Appendix 4). Approximately 100 m downstream from the lake, the outlet had an average wetted width of 1.5 m, average depth of 4 cm, gradient of 2.5%, and a water temperature of 5° C.

ANGLER USE AND CATCH PER UNIT EFFORT

No on site anglers were present at the time of this survey. Creel information was gathered from our own angling efforts (2 people). Angling catch per unit effort was 3 rainbow trout per rod hour. Angler use is unknown: however, an estimated 30 - 50 individuals hike to the lake each year (J. Ladds, B.C. Forest Service, Pers. Comm.). A resident of the Finlay Bay area indicated individuals go to the lake for the combination of hiking and fishing. All of the people she has talked to indicated a high level of satisfaction with the present angling opportunity (Emma Svisdahl, Pers. Comm.).

BENCHMARK

The original benchmark set in 1989 was located. This benchmark is located on the NE shore, 10 m from the water's edge in a 20 cm diameter spruce tree. The benchmark was set at an initial height above water level of 2.0 meters. The benchmark is currently 2.0 m above the current lake level, indicating no change in lake level since the 1989 study. The benchmark was re-painted orange.

MISCELLANEOUS COMMENTS

Photographs of Canty Lake were taken but are not available due to camera failure. Photographs of Canty Lake were taken in 1989 and can be found in the Reconnaissance Survey report of Canty Lake on file at the Ministry of Environment, Lands and Parks, Fish and Wildlife Branch, Prince George.

Lake: **Canty**

RESORTS AND CAMPSITES

Present lake access is via a 2.25 km hiking trail from km 85.5 of the Parsnip West Forest Service Road. At the time of survey, the sign at the turn off from this F.S.R. indicating the location of the Canty Lake trail was missing. Local residents indicated the sign has been missing for the last two years.

There is a Forest Service campsite located at the SW end of the lake at the head of the hiking trail. Outhouses and picnic tables are provided for public use.

FISHERIES MANAGEMENT COMMENTS

Canty Lake supports a relatively large population of smaller rainbow trout (stocked). The rainbow trout captured during the investigation had a healthy appearance, and appeared to be in fair condition (C.F. 1.09 (0.70 - 1.28)) (Appendix 3). Due to the cold water temperatures of this high altitude lake, some degree of stunting in the size of these fish is apparent. White parasites on the stomach wall and internal organs were present on 13 of the examined rainbow trout. Stomach content analysis revealed that rainbow trout are targeting insects as a primary food source.

The beaver dam at the lake outlet does not presently affect lake level. Moderate quality spawning habitat is available downstream of the beaver dam. Breeching the beaver dam would probably not create a sustainable population of rainbow trout due to the limited amount of spawning habitat present in the outlet and the loss of juveniles migrating downstream past waterfalls. The outlet flows approximately 200 m from the lake and then plummets down a steep bedrock mountainside. Juvenile rainbow trout were noted 3 m downstream of the beaver dam but could not swim back into the lake. It could not be determined if these fish were the result of recruitment from the 1990 stocked fish, or recently released fall fry from the 1994 stocking.

Adult fish were coloured as if they were in spawning condition. All fish appeared small and stunted, spawnbound was evident. Five of the examined fish had reabsorbed eggs in the body cavity.

The fisheries management strategy behind the stocking of Canty Lake is to produce a low use fishery that complements the wilderness experience. Fishing is not intended to be the sole reason recreationalists visit the lake (Duane Jesson, M.O.E.L.P. Prince George, Pers. Comm.).

Lake: **Canty**

Stocking Program

The current stocking program appears to be very successful. Natural recruitment is unlikely due to beaver dam presence. The current schedule of stocking every fourth year should be adequate to maintain a satisfactory sport fishery. A total of 2,500 fall fry rainbow trout were stocked in Canty Lake in 1994.

Enhancement Potential

Conversation with Jim Ladds (Ministry of Forests, Mackenzie) indicated a conflict with area residents. Canty Creek downstream of the lake is the water supply for a local area resident. This owner has an agreement with the registered trapper of the area not to remove the dam or beavers at the lake. The owner fears poor water quality will result if the dam is breached.

If the issue of multiple use is satisfactorily resolved enhancements on the initial 100 m of the outlet creek may include beaver dam removal, use of beaver fencing materials and habitat complexing. The benefits would include relieving the chronic spawnbound situation, and the possible creation of a naturalized population. However; a once every four year stocking for a "put and take fishery" would be more cost effective in the long term.

REFERENCES

DFO/MOE. 1987. Stream Survey Field Guide. Fish Habitat Inventory and Information Program. 33p.

APPENDIX 1

Netting Record

Lake: **Canty**

NETTING RECORD

Number of panels: 6
Individual panel length: 15.2 m
Mesh size experimental order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking monofilament
Date Set:	October 6, 1994 @ 13:00 hrs
Date Lifted:	October 6, 1994 @ 17:45 hrs
Net Dimensions:	Length: 91.4 m, Width: 2.4 m
Shallow End Mesh Size:	25 mm
	Fished at a depth of 1.0 m.
	Substrate: gravel
Deep End Mesh Size:	64 mm
	Fished at a depth of 3.5 m.
	Substrate: unknown

Comments:

1) A total of eight rainbow trout were released live from the gill net.
2) Only 31 rainbow trout were killed and sampled from the gill net.

APPENDIX 2

Individual Fish Data

Lake: **Canty**

INDIVIDUAL FISH DATA

Date Captured: October 6, 1994

Capture Method: Sinking monofilament gill net.

M - Male
F - Female
? - Not Obvious
SP - Spent

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
OT - Otolith
? - Not Obvious

EG - Egg
FR - Fin Ray
HD - Head
ML - Milt

SC - Scale
ST - Stomach
TG - Fish Tag
WF - Whole Fish

Species	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
Rainbow trout	21.3	124	F	MG	SC	4 +		Diptera larvae Trichoptera		detritus shrimp	parasites on stomach reabsorbed eggs
Rainbow trout	22.5	124	F	MG	SC	4 +		Diptera larvae Trichoptera	fish eggs	woody debris shrimp	reabsorbed eggs
Rainbow trout	25.0	175	F	MG	SC	4 +		beetles Diptera larvae mosquito		shrimp	parasites on stomach
Rainbow trout	28.0	247	M	MG	SC	4 +		Diptera larvae bloodworm		detritus clam shrimp	
Rainbow trout	22.1	124	F	MG	SC	4 +	Zooplankton	Trichoptera		detritus	reabsorbed eggs
Rainbow trout	27.2	252	M	MG	SC	4 +		Diptera larvae		detritus shrimp	white parasites on stomach
Rainbow trout	26.3	222	F	MG	SC	4 +		Diptera larvae		detritus	
Rainbow trout	25.0	161	F	MG	SC	4 +		Diptera larvae		detritus shrimp	white parasites on stomach
Rainbow trout	28.3	231	M	MG	SC	4 +		Diptera larvae		Gammarus detritus shrimp clam	
Rainbow trout	23.1	157	M	MG	SC	4 +		Diptera larvae	fish eggs	shrimp	white parasites on stomach
Rainbow trout	24.0	175	F	MG	SC	4 +		Diptera (wing)		clam shrimp	
Rainbow trout	26.5	222	F	MG	SC	4 +					white parasites on internal organs, long and stringy
Rainbow trout	28.6	261	F	MG	SC	4 +		Diptera larvae		detritus wood	
Rainbow trout	29.5	280	M	MG	SC	4 +	Zooplankton			detritus	
Rainbow trout	28.7	248	F	MG	SC	4 +	Zooplankton			detritus	
Rainbow trout	22.2	127	M	MG	SC	4 +		Winged insects (terrestrial)			
Rainbow trout	26.5	213	F	MG	SC	4 +		Aquatic insects		Gammarus	
Rainbow trout	23.0	148	M	MG	SC	4 +		Diptera larvae		shrimp	
Rainbow trout	24.5	171	F	MG	SC	4 +		Diptera larvae Trichoptera	fish eggs	wood clams	white parasites on stomach

Lake: Canty

INDIVIDUAL FISH DATA

Date Captured: October 6, 1994

Capture Method: Sinking monofilament gill net (6 RB caught by angling)

M - Male, F - Female, ? - Not Obvious, SP - Spent
IMM - Immature, MG - Maturing, MT - Mature, GV - Gravid, OT - Otolith, ? - Not Obvious
EG - Egg, FR - Fin Ray, HD - Head, ML - Milt
SC - Scale, ST - Stomach, TG - Fish Tag, WF - Whole Fish

Species	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
Rainbow trout	28.6	274	F	MG	SC	4 +				snails clams detritus	
Rainbow trout	27.1	239	F	MG	SC	4 +		Diptera larvae		snails shrimp	
Rainbow trout	23.9	149	F	MG	sc	4 +	Zooplankton	Diptera larvae			
Rainbow trout	23.7	158	M	MG	sc	4 +		Diptera larvae		detritus wood	white parasites on stomach
Rainbow trout	24.3	151	F	MG	sc	4 +		Diptera larvae		detritus	white parasites on stomach
Rainbow trout	22.2	125	F	MG	sc	4 +		Diptera larvae		detritus	reabsorbed eggs in body cavity
Rainbow trout	28.9	263	M	MG	sc	4 +		bloodworm	fish eggs	shrimp clams	
Rainbow trout	26.1	197	M	MG	sc	4 +		Trichoptera Diptera larvae		clams wood shrimp	
Rainbow trout	24.6	159	F	MG	sc	4 +		Diptera larvae beetles		detritus	parasites on stomach wall
Rainbow trout	23.7	149	F	MG	sc	4 +		Diptera larvae bloodworm		shrimp	parasites on stomach wall
Rainbow trout	23.7	147	F	MG	sc	4 +		Diptera larvae		shrimp	one cyst on stomach
Rainbow trout	28.5	237	M	M	sc	4 +		Diptera larvae		shrimp	white parasites on stomach reabsorbing eggs
Rainbow trout	28.1	227	M	M	sc	4 +				detritus	angled fish (killed)
Rainbow trout	29.0	170	?	?	sc	4 +					angled fish spawning colours
Rainbow trout	26.7	170	?	?	sc	?					angled fish spawning colours
Rainbow trout	27.9	170	?	?	sc	4 +					angled fish spawning colours
Rainbow trout	26.3	170	?	?	sc	4 +					angled fish
Rainbow trout	24.7	1 14	?	?	no scale	?					angled fish

Lake: **Canty**

AGE DETERMINATION COMPLETED BY:
Margaret Macdonald, Box 243, Midway, B.C.

AGE DETERMINATION VERIFIED BY:
Arne Langston, Peace/Williston Fisheries Compensation Program, Prince George, B.C.

APPENDIX 3

Individual length, weight, and condition factor

Lake: Canty

INDIVIDUAL LENGTH, WEIGHT, AND CONDITION FACTOR

SPECIES	FORK LENGTH (cm)	WEIGHT (g)	CONDITION FACTOR
Rainbow trout	21.3	124	1.28
Rainbow trout	22.1	124	1.15
Rainbow trout	22.2	125	1.14
Rainbow trout	22.2	127	1.16
Rainbow trout	22.5	124	1.09
Rainbow trout	23.0	148	1.22
Rainbow trout	23.1	157	1.27
Rainbow trout	23.7	147	1.10
Rainbow trout	23.7	149	1.12
Rainbow trout	23.7	158	1.19
Rainbow trout	23.9	149	1.09
Rainbow trout	24.0	175	1.27
Rainbow trout	24.3	151	1.05
Rainbow trout	24.5	171	1.16
Rainbow trout	24.6	159	1.07
* Rainbow trout	24.7	114	0.76
Rainbow trout	25.0	161	1.03
Rainbow trout	25.0	175	1.12
Rainbow trout	26.1	197	1.11
* Rainbow trout	26.3	170	0.93
Rainbow trout	26.3	222	1.22
Rainbow trout	26.5	213	1.14
Rainbow trout	26.5	222	1.19
* Rainbow trout	26.7	170	0.89
Rainbow trout	27.1	239	1.20
Rainbow trout	27.2	252	1.25
* Rainbow trout	27.9	170	0.78
Rainbow trout	28.0	247	1.13
* Rainbow trout	28.1	227	1.02

Lake: **Canty**

INDIVIDUAL LENGTH, WEIGHT, AND CONDITION FACTOR

SPECIES	FORK LENGTH (cm)	WEIGHT (g)	CONDITION FACTOR
Rainbow trout	28.3	231	1.02
Rainbow trout	28.5	237	1.02
Rainbow trout	28.6	261	1.12
Rainbow trout	28.6	274	1.17
Rainbow trout	28.7	248	1.05
Rainbow trout	28.9	263	1.09
* Rainbow trout	29.0	170	0.70
Rainbow trout	29.5	280	1.09
* Note: The weights for the six angled fish were measured on a less sensitive/accurate hand held digital weight scale. As a result, the weight and condition factor of these fish appear smaller than the 31 rainbow trout measured on the more accurate electronic weight scale.			
Mean	25.7	187.3	1.09
Minimum	21.3	114	0.70
Maximum	29.5	280	1.28
Standard Deviation	2.4	49.4	
Number of fish = 37.			

APPENDIX 4

Tributary Stream Data

Lake: **Canty**

System Name: **Canty C.** **outlet #1**

System No.:

Site Location: Sample Site #1, located 100 m downstream of lake on the outlet. (20 m downstream of beaver dam)

Date:	October 6, 1994.	Time:	15:00 hrs
Channel Width:	1.6 m	Water Temperature:	5.0 °C
Wetted Width:	1.5 m	Stage (flow):	Low
Max. Depth:	10 cm	Velocity:	0.31 m/sec
Ave. Depth:	4.0 cm	Field Gradient:	2.5 %
Turbidity:	10 cm	Colour:	crystal clear

Flood Signs:

Height: 20 cm
Type: bank erosion

Substrate Breakdown:

Fines	Small Gravel	Large Gravel	Cobble
80 %	10 %	5 %	5 %
Boulder	**Bedrock**		
-- %	-- %		

Substrate Compaction: low/moderate Sand: 60 %

Banks:

	Form	Height	Stability
Right	near vertical	90 cm	high, due to moss and rooted vegetation on bank
Left	near vertical	1.0 m	high, due to moss and rooted vegetation on bank

Comments

1) Site has some spawning habitat.
2) Flow stage dependant on beaver dam condition.